

Mercury Pollutant Minimization Program Guidance Manual For Municipalities

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User's Guide To Pollutant Minimization Program Acronyms

Listed below are some of the most common acronyms and abbreviations used in the Mercury Pollutant Minimization Program Guidance Manual.

ADA	American Dental Association
AHA	American Hospital Association
AMEL	Alternative Mercury Effluent Limit
BMP	Best Management Practices
CWA	Clean Water Act
DOA	Department of Administration
FDA	Food and Drug Administration
HCWH	HealthCare Without Harm
HHW	Household Hazardous Waste
HVAC	Heating, Ventilation & Air Conditioning
ISO	International Organization of Standards
MGD	Million Gallons Per Day
NPDES	National Pollution Discharge Elimination System
NRPC	Northwest Regional Planning Commission
PCB	Polychlorinated Biphenyls
PMP	Pollutant Minimization Program
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QC	Quality Control
SHWEC	Solid & Hazardous Waste Education Center
SOP	Standard Operating Procedures
USEPA/EPA	U.S. Environmental Protection Agency
WDA	Wisconsin Dental Association
WDNR	Wisconsin Department of Natural Resources
Wis. Adm. Code	Wisconsin Administration Code
Wis. Stats.	Wisconsin Statutes
WLSSD	Western Lake Superior Sanitary District
WPDES	Wisconsin Pollutant Discharge Elimination System
WQBEL	Water Quality-Based Effluent Limitation
WW BMP	Wastewater Best Management Practices
WWTP	Wastewater Treatment Plant
WWW	World Wide Web

Introduction

Clean water is essential to Wisconsin's economy and quality of life. Lakes and streams provide drinking water, recreational opportunities such as swimming and boating, and habitat for fish, wildlife, and other aquatic species. Wastewater treatment plants play a vital role in maintaining the water quality standards necessary to support this environment. Mercury finds its way into municipal sanitary sewer systems from a large number of individually small sources. While treatment plants can remove a lot of mercury from wastewater streams, the only cost-effective way to reduce mercury discharges to the low levels needed to meet water quality standards is to remove mercury before it is released to the sewer system. This manual describes Wisconsin's program for developing and reporting Mercury Pollutant Minimization Programs.

Because treatment plants in nearby areas will be faced with the same requirement to reduce mercury influent to their systems, we strongly encourage municipalities to coordinate with each other in the development and implementation of their Mercury Pollutant Minimization Programs. Many Wisconsin municipalities already have experience in this work that they can share with those to whom mercury reduction activities are new. This will be particularly true for larger municipalities who can share their experience with smaller communities. Many of the specific examples used in this manual are from pilot mercury work conducted in Wisconsin over the last several years.

This manual accommodates several realities about mercury discharges into publicly owned treatment works. First, most municipal wastewater treatment plants are not meeting the water quality-based 1.3 ng/l effluent limit for mercury in their discharges to the surface waters of Wisconsin. Second, many users of sanitary sewer systems that have historically used mercury-containing products are not meeting sewer use ordinance limits already in place for their discharges to their local wastewater treatment plant. And third, the number of potentially noncompliant users is very large and represented by sectors of the community that have not traditionally been subject to wastewater regulation for metals like mercury, e.g., hospitals, dental offices, and schools.

The traditional approach to this problem would be to issue discharge permits to these many mercury discharging facilities, require periodic wastewater sampling and analysis to determine compliance with the sewer use ordinance limit for mercury, and implement stepped enforcement programs to force changes or installation of technology to achieve wastewater compliance. Monitoring and administrative costs for these procedures are substantial, and in most municipalities would need to be paid by the permitted users of the treatment plant.

This manual offers an alternative solution to this problem: mercury-using facilities that agree to implement Best Management Practices for mercury products, and document that accomplishment to the local sewerage authority, may be deemed to be compliant with wastewater discharge standards. This approach in many cases will require no permits, no wastewater sampling and analysis, and only enough oversight by the municipality to ensure that the Best Management Practices are in fact being implemented. Further, the Best Management Practices are specific to each sector of the community and are commonly used by that particular type of facility. This is a "pollution prevention" solution for mercury reduction. Facilities choosing to not implement Best Management Practices always have the option of traditional discharge regulation as provided in existing sewer use ordinances.

This manual draws on the Wisconsin Department of Natural Resources' experience in mercury reduction pilot activities with twenty municipal partners over the last several years. The manual is also consistent with USEPA Guidance on Mercury Pollutant Minimization Programs and with Wisconsin's and EPA's Wastewater Pretreatment Program. The Department has tried to make this manual as simple to use as possible, with the constraint that each discharging user facility must be accountable for implementing Best Management Practices and each municipality must be accountable for implementing a community-wide Mercury Pollutant Minimization Program.

Finally, our experience with our municipal partners produced a fourth reality: that the general public is pleased to participate in mercury reduction activities because they can see their personal contribution towards environmental protection. Many of the participating pilot communities extended their mercury reduction work to households (mercury fever thermometers); HVAC heating, ventilation, and air conditioning contractors (mercury thermostats); scrap yards (auto hood and truck mercury switches); and even dairy farms (milk house mercury manometers). While these products do not typically end up in wastewater discharges, we have explicitly given credit for this extra work in this manual.

How to Use This Manual

The Mercury Pollutant Minimization Program Guidance Manual for Municipalities is divided into several sections.

- **Chapters 1 and 2 provide background information** on mercury pollution and Mercury Pollutant Minimization Programs, and should be read before referring to the forms in Chapter 3. Many of the terms discussed throughout the manual are defined in Chapters 1 and 2.
- **Chapter 3 includes instructions on how to fill out the forms** for a Mercury Pollutant Minimization Program Plan and a Mercury Pollutant Minimization Program Annual Report, as well as the forms themselves. The directions should be reviewed carefully before filling out the forms to make sure they are completed correctly. The Wisconsin copies of this manual may also include the forms on a CD where the forms can be filled out electronically in Microsoft Excel.
- **Appendix A contains case studies** of mercury educational outreach for various sectors of the community.
- **Appendix B includes administrative rules and other guidance** related to developing a Mercury Pollutant Minimization Program, sewer use ordinances, and mercury sampling and monitoring procedures.
- **Appendices C through F give examples of completed Mercury PMP forms** based on municipal treatment plant size.

Chapter One: Mercury All Around Us

Properties and Uses of Mercury

Mercury is an Element

Imagine, long ago, hot lava flowing down a volcano in Italy. Deep within the cooling layers of rock, water rises on its way toward the surface. As the water rises it leaves deposits of sulfur,



Figure 1. Elemental mercury sitting atop cinnabar

forming a red-colored mineral called cinnabar, or mercury sulfide. Elemental mercury constitutes only 0.5 parts per million of the earth's crust, making it scarcer than uranium but more plentiful than gold or silver. Ancient Romans mined cinnabar for mercury; some of the ancient Roman mines are still in use today. In Roman mythology, Mercury was a swift messenger of the gods. Elemental mercury, which is the only metal that is a liquid at room temperature, got its name from the Roman god because its high surface tension causes it to form spheres that can roll and flow very quickly. For this reason, and because it

is a silver-white metal, mercury is also called quicksilver.

Mercury has Many Uses

Mercury has been found in Egyptian tombs dating back to 1500 B.C., and it has been used for centuries in medicines. While mercury is no longer sold as a dermal or oral antiseptic, an organic form continues to be used as a vaccine preservative. The ancient Greeks and Romans used mercury in cosmetics and it was also one of the primary cures for syphilis in Europe before modern times. During the medieval period, alchemists thought mercury could be hardened to produce gold. In some cultures, spiritualists associate mercury with mystic qualities and it continues to be used to “bless” homes, cars and apartments. Although its toxic effects are well understood, mercury continues to be used in a wide variety of products and manufacturing processes because it is very useful (Table 1).



Figure 2. Mercury is put in amulets by Central American spiritualists.

Elemental mercury is used in thermometers, blood pressure devices, and thermostats because its ability to expand and contract uniformly makes it useful for measuring changes in temperature and pressure. Although many liquids could be used in pressure measuring devices, mercury is used because its high density requires less space. It is also a good conductor of electricity, so it is a useful component of electrical switches.

Mercury is also used in dental fillings, paints, soaps, batteries, and fluorescent lighting. Mercury will dissolve numerous metals to form amalgams and is used to extract gold dust from rocks by dissolving the gold and then boiling off the mercury. The amalgam used in dental fillings

contains tin and silver alloyed with mercury. Because it works as a biocide, mercury has been used as a fungicide in paint, though this kind of paint is no longer sold.

Table 1. Properties and Uses Of Mercury	
PROPERTIES	USES
1. Liquid metal	1. Barometers, blood pressure cuffs
2. Expands/contracts with temperature	2. Thermometers
3. Conducts electricity	3. Switches, fluorescent bulbs, electrolytic production of chlorine
4. Amalgamates with other metals	4. Dental fillings, gold purification
5. Kills bacteria and fungi	5. Disinfectants, preservatives

Other Forms of Mercury

Inorganic mercury compounds occur when mercury combines with elements such as chlorine, sulfur, or oxygen, and some of these compounds can be created in a lab. These mercury compounds are also called mercury salts. Most inorganic mercury compounds are white powders or crystals, except for cinnabar (HgS), which is red and turns black after exposure to light. Some inorganic mercury compounds, such as mercuric chloride (HgCl₂), are violent poisons.



Figure 3. Elemental mercury. Its symbol on the periodic table of elements is "Hg."

When mercury combines with carbon, the compounds formed are called “organic” mercury compounds or organomercurials. There are a potentially large number of organic mercury compounds, but the most common organic mercury compound in the environment is methylmercury (HgCH₃). When elemental mercury enters a water body, certain microorganisms can convert it to methylmercury during their normal metabolic processes. Methylmercury is the form that ends up in fish tissue and is ingested by humans.

Mercury Release

Releases to the Environment

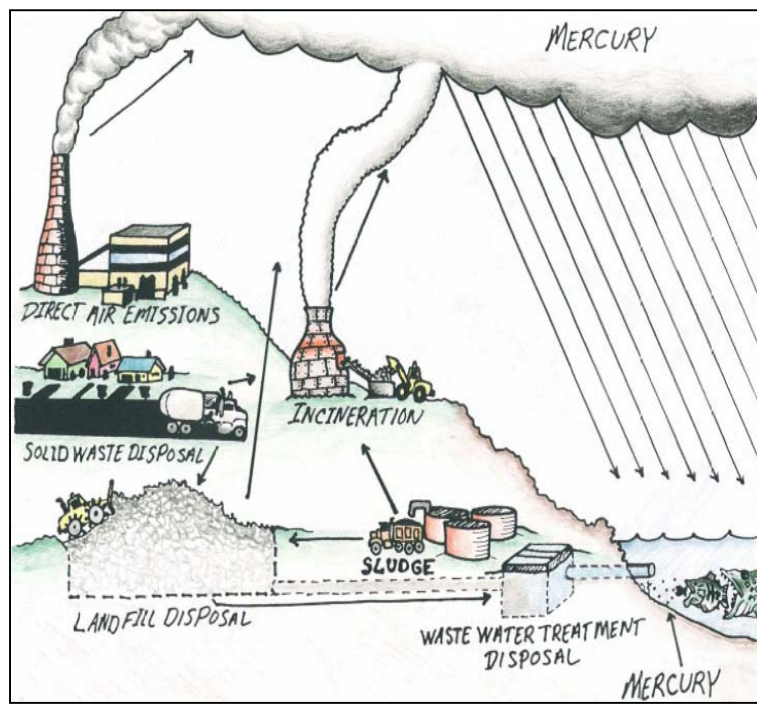
Mercury releases to the environment are from two main sources, nature and humans. Natural sources include mercury that is mobilized from the earth’s crust, through volcanic activity, weathering of rocks, or forest fires. Today, most of the mercury that makes its way into the environment comes from anthropogenic (human-caused) sources.

Coal-fired power plants are the largest source of mercury released into the atmosphere, about 1,200 kg of mercury each year in Wisconsin. But mercury is also released from products and

processes during manufacture, breakage or spillage during use, and during disposal (Table 2). Remobilization of historic mercury occurs when mercury deposits from soils, sediments, water bodies, landfills, and waste tailings are disturbed.

Table 2: Estimated Mercury Distribution in Wisconsin in Year 2000 From the Most Common Mercury-Containing Products					
PRODUCT	To:	Air	Water	Land	Total
Dental Amalgam ¹		205	23	883	1111
Thermostats		139	1	517	657
Fever thermometers		68	0	199	267
Fluorescent bulbs		91	0	172	263
Automobile switches		43	0	66	109
TOTALS²		546	24	1837	2407
units in kg Hg/year (kg = 2.2 lbs)					

1. Mercury bound in an alloy with other metals.
 2. An additional 600 kg Hg/year is released from other products not listed in Table 2.
- Source: Barr Engineering, Minneapolis, MN and Wisconsin Department of Natural Resources.



Mercury Deposition

The deposition rates of mercury today are 1.5 to 3 times higher than they were before the industrial age. When mercury is discharged to land or water, it doesn't degrade over time. Instead, it evaporates and enters the atmosphere. Once in the atmosphere, mercury can travel for hundreds or thousands of miles before raining down on land or the surface of an ocean or lake (Figure 4). These storms are equal opportunity providers – they rain on countries and isolated locations where no man-made pollutants are produced.

Figure 4. Mercury gets into the air from several sources including coal burning and waste incineration, and it gets into wastewater from places like dental offices, schools, medical facilities, and homes. Some of this mercury eventually ends up in the fish we eat. Bioaccumulation causes the mercury concentration to be much greater in the fish than in the water.

At the same time, mercury can also be discharged from sources very close to home. In the U.S., mercury in the atmosphere tends to travel east with prevailing winds, where it rains out along the eastern seaboard (Figure 5).

What's the Problem with Mercury?
It's In the Fish

Health Problems and Mercury

People can come into contact with mercury by breathing vapors, skin absorption, and ingestion. Breathing the vapors is particularly dangerous, and can happen in the home, workplace, or anywhere mercury has been spilled. When metallic mercury is touched it can slowly pass through the skin. Metallic mercury generally does not absorb very well when swallowed. However, people can be exposed to mercury by eating fish or shellfish caught in contaminated waters. Mothers who eat these fish pass mercury to their fetuses, where it can damage the developing brains of children and may affect a child's behavior, memory, and ability to learn. In adults, accumulation of mercury can also affect the nervous system and result in a range of other health effects, including irritability, loss of coordination, and liver and kidney damage.

National Atmospheric Hg Deposition

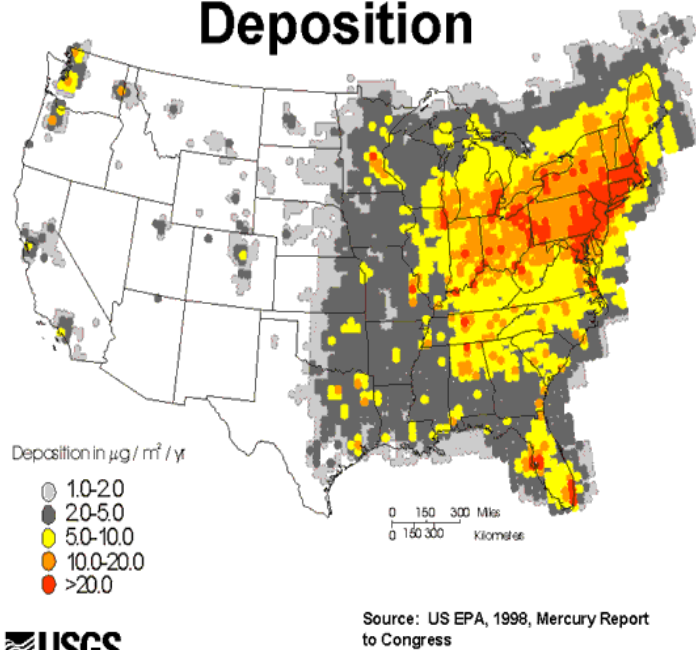


Figure 5. Mercury released into the air in industrial areas tends to blow east with prevailing winds.

The most common way that people and animals are exposed to mercury is by eating contaminated fish. The mercury that falls out of the atmosphere into waterbodies and the mercury being discharged from wastewater effluent isn't highly concentrated. However, microbes in the sediment at the bottom of a lake or stream can convert mercury into methylmercury, which is a toxin of great concern. Small organisms, such as zooplankton, consume the microbes that contain methylmercury; this buildup of mercury in their tissues is called **bioaccumulation**. Small fish eat the contaminated zooplankton, and larger fish eat the smaller fish. Mercury increases up the food chain until it is many times more concentrated in living organisms than in the surrounding water, in a process called bioconcentration or **biomagnification**.

The mercury taken up by fish is distributed throughout its body, including the fillets that people eat. Specific cooking methods and trimming fat can reduce some chemicals but they do not reduce mercury in the portions typically eaten by people. When people and animals eat a lot of large predatory fish, they can accumulate enough methylmercury in their bodies to cause health problems. Methylmercury buildup in fish-eating wildlife has been linked to reproductive problems, impaired growth and development, behavioral abnormalities, and even death.

Table 3: Wisconsin's Safe Eating Guidelines for Sport Fish

*Women of childbearing years, nursing mothers and all children under 15 may eat:**

1 meal per week	Bluegill, sunfish, black crappie, white crappie, yellow perch or bullheads, AND
1 meal per month	Walleye, northern pike, smallmouth bass, largemouth bass, channel catfish, flathead catfish, white sucker, drum, burbot, sauger, sturgeon, carp, white bass, rock bass or other species.

**Muskie should not be eaten by this group of people due to high mercury content.*

Men, and women beyond their childbearing years may eat:

Unlimited amounts	Bluegill, sunfish, black crappie, white crappie, yellow perch, or bullheads, AND
1 meal per week	Walleye, northern pike, smallmouth bass, largemouth bass, channel catfish, flathead catfish, or other species.

Additional restrictive advice is necessary for some waters where fish have been found to contain higher levels of mercury. See www.dnr.wi.gov/org/water/fhp

Fish purchased in stores and restaurants may also contain contaminants. Follow these guidelines for popular commercial species to reduce your exposure to mercury:

Purchased Species	Women of child-bearing age and children under 15	Women beyond child-bearing age, and men
Salmon, shrimp, canned light tuna, pollock, catfish	2 meals per week	Unlimited consumption
Canned white tuna, tuna steaks, halibut	2 meals per month	1 meal per week
Shark, swordfish, king mackerel, tilefish	Do Not Eat	1 meal per month

In 2003, 45 states had mercury-related fish consumption advisories. Some advisories are statewide, while others apply to certain lakes, rivers, or coastal areas. Currently (2005), the “Safe Eating Guidelines” for mercury listed above apply to all Wisconsin lakes and rivers (other than the Great Lakes). Additional consumption advice applies to 94 waters due to particularly high concentrations of mercury. Advisories are updated as additional data are obtained. Because of the impact of mercury on the developing nervous system, children, pregnant women, and women of childbearing age must monitor their consumption of sport-caught and commercial fish. The nutritional benefit of eating fish will outweigh the risk posed by mercury as long as advisory guidelines are followed.

It's in Products that Break or Spill

Mercury-containing products do not pose a health risk as long as they are handled correctly and disposed of safely. If they are broken, liquid mercury will evaporate at room temperature and form mercury vapors. Mercury vapors are colorless and odorless, and inhaling the invisible vapor can lead to serious mercury poisoning. The higher the temperature, the more vapors will be released from liquid metallic mercury. Some people who have breathed mercury vapors report a metallic taste in their mouths. Even a small amount of mercury can lead to health and environmental problems.



Figure 6. Mercury-containing thermometers.

A Green Bay High School student took a bottle of mercury from the school's science lab in March 1999. She shared it with friends who poured the mercury on their skin and brought it to a bowling alley, where they filled the finger holes of the bowling balls and rolled them down the lanes. When the mercury spill was discovered, students were detained in their classrooms until the extent of the spill was ascertained. Four students were sent to the hospital and 88 students were put in decontamination showers, though no one was permanently injured. The total cost of the mercury spill at the school, a home, and the bowling alley was \$230,000, though the cost was settled at \$175,000. The family of the student who stole the mercury paid \$6,000 in restitution while the remaining costs were paid by the school district.

Universal Wastes

In order to promote collection and recycling of mercury-containing products, the U.S. EPA and WDNR have included the most common mercury products in their Universal Waste Rules. These rules reduce handling and transportation requirements for wastes that otherwise would need to be managed as "hazardous wastes." But inclusion in the Universal Waste Rules, or in some cases complete exemption from Hazardous Waste Rules, is only permitted where the mercury products are recycled. Most mercury products not recycled must be managed as hazardous wastes. For more information see EPA's Discarded Mercury-Containing Equipment Rule webpage at

www.epa.gov/epaoswer/hazwaste/recycle/electron/crt.htm

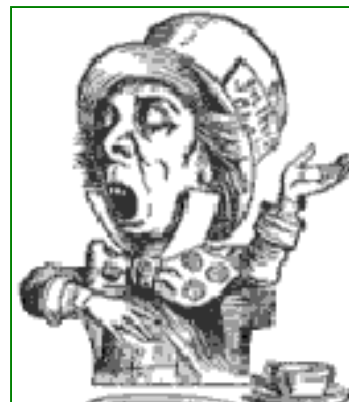


Figure 7. **Chronic Mercury Exposure:** Mercuric nitrate was used in the hat-making industry up until the 1940s. Hat-makers in Danbury, Connecticut developed a reputation for strange behavior related to their exposure to mercury, and the "Danbury shakes" was a term that referred to the tremors that resulted from mercury poisoning.

Sources:

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Chapter Two: Mercury Pollutant Minimization Programs

What is a Mercury Pollutant Minimization Program?

A Wisconsin municipal wastewater treatment plant needs to implement a Mercury Pollutant Minimization Program when effluent sampling and analysis show that their mercury discharges exceed the water-quality-based limit of 1.3 ng/l. Municipal treatment plants typically remove 90% or more of the mercury entering the plant, but even this high removal rate is generally not sufficient for the plant effluent to consistently meet this very low limit. The only cost-effective way to do this is to reduce mercury discharges into the treatment plant from users of the sanitary sewer system. The goal of a Mercury Pollutant Minimization Program (Mercury PMP) is to achieve and maintain municipal wastewater treatment plant mercury discharges below 1.3 ng/l by reducing or eliminating mercury discharges from users of the sanitary sewer system.

1. Mercury PMP -- Municipal Responsibilities.

Municipal responsibilities for planning and implementing a Mercury PMP are contained in NR 106.145 Wis. Adm. Code, Mercury Regulation, particularly:

NR 106.145(7)(c) – Mercury PMP;

NR 106.145(7)(f) – Mercury PMP Plan; and

NR 106.145(7)(g) – Mercury PMP Annual Report.

Municipalities initially submit a Mercury PMP Plan to the Department of Natural Resources (Department) according to their Wisconsin Pollutant Discharge Elimination System (WPDES) permit schedule. If the Plan is acceptable, annually thereafter they submit to the Department a Mercury PMP Annual Report documenting implementation of their mercury reduction program. In exchange for implementing the Mercury PMP, a temporary alternative mercury effluent limit greater than 1.3 ng/l may be granted to the municipality. At the time of their next WPDES permit renewal, the wastewater plant mercury effluent data is again evaluated to determine whether a continuing effluent limit variance and Mercury PMP are still warranted.

Municipalities have the fundamental responsibility to prevent the “pass through” of pollutants, in this case mercury, to Wisconsin surface waters from users of their sanitary sewer system. This responsibility is contained in NR 211 Wis. Adm. Code, General Pretreatment Requirements, particularly:

NR 211.10(1) and (3) – Prohibited Discharge Standards; and

NR 211.41 – POTW Action to Reduce Mercury Discharges from All Sources.

While the Department may establish a temporary alternative mercury effluent limit greater than 1.3 ng/l in a municipality’s WPDES permit, the alternative limit will only be granted if users of the municipal plant are required by the municipality to minimize mercury discharges to the sanitary sewer system. The municipality needs to ultimately achieve a water-quality-based mercury discharge of 1.3 ng/l and not simply maintain their alternative mercury effluent limit.

Sections NR 106.145 and the principal sections of NR 211, Wis. Adm. Code, are included in Appendix B. In summary, these codes call for a municipal program of mercury source identification, education, discharge control, and program effectiveness evaluation. Municipalities are asked to educate users of the sanitary sewer system about mercury reduction practices, but they also have the authority to obtain user mercury reduction by the establishment of user discharge standards and implementation of formal wastewater regulatory tools.

Please note that this Guidance Manual does not prescribe any specific method for mercury source identification, specific educational outreach mechanism, or a specific program for collecting mercury by the municipality, elements of a Mercury Pollutant Minimization Program required under NR 106.145(7)(c). The Department and permittee may agree on these and other program elements appropriate to the needs and circumstances of the individual municipality. This manual is designed to facilitate methods and practices that have been shown to be effective as part of a Mercury PMP program, to measure program activity and effectiveness, and to identify program barriers, but is not a mandate for only one set of activities by any particular municipality.

2. Mercury PMP – User Responsibilities.

Treatment plant users that discharge mercury to municipal plants whose effluent does not meet 1.3 ng/l need to reduce their discharges of mercury to the greatest extent practicable, and as soon as possible, to avoid the user “pass through” prohibition of NR 211.10(1). In fact, all of the larger municipalities in Wisconsin have already adopted stringent sewer use ordinance mercury discharge limits for treatment plant users in order to prevent the pass through of mercury to Wisconsin surface waters. Smaller municipalities may also adopt such ordinance limits if necessary to reduce treatment plant mercury discharges.

Discharging mercury exposes the user to substantial wastewater regulatory costs and procedures. When municipalities implement sewer use ordinance limits, they typically issue discharge permits to treatment plant users, conduct user wastewater compliance monitoring and facility inspections, and perform stepped enforcement procedures to obtain ordinance limit compliance. These are labor-intensive procedures for both the municipality and for the sewer system user. The costs of these regulatory procedures are typically borne by the user since they are the source of the pollutant requiring control.

Mercury Best Management Practices (BMPs):

- *Reduce the use of mercury-containing products by switching to cost-effective non-mercury alternative products;*
- *Capture and recycle those mercury-containing products that continue to be used rather than discarding mercury wastes to the sanitary sewer; and*
- *Reduce the potential for mercury spills that may be discharged to drains.*

Mercury BMPs can be as general as a facility implementing a mercury-free purchasing program and training staff in mercury spill cleanup, or as specific as installing standard wastewater treatment technology for continuing discharges of mercury to the sanitary sewer system.

This is not the preferred mercury control mechanism of this Guidance Manual. Mercury is discharged into municipal wastewater treatment plants from a large number of individually small sources, and these small sources have not traditionally been regulated with the permit, monitoring, and enforcement tools of a formal wastewater control program. As an alternative, this Guidance Manual recommends streamlining these procedures for treatment plant users that simply implement, and confirm to the municipality that they have implemented, the Best Management Practices (BMPs) for mercury common to their type of business or facility. This approach reaches the same end point as a mercury control program relying on traditional regulatory procedures since the formal regulatory program would require these same mercury BMP practices, but via a set of administrative steps much more costly for both the municipality and for the sanitary sewer system user. If an individual user does not implement mercury BMPs, their wastewater discharge can still be controlled by applying sewer use ordinance mercury limits via the traditional regulatory tools noted above.

Additional discussion of the relationship between Mercury Best Management Practices, Numerical Mercury Discharge Limits in Sewer Use Ordinances, Traditional Wastewater Regulatory Procedures, and Consistency with U.S. EPA Mercury PMP Guidance are included in the Addendum at the end of this chapter.

3. Municipal Plant Users that Discharge Mercury.

Recent experience in the United States and Canada, including pilot mercury reduction work in Wisconsin, indicates that about 50% of the mercury influent to municipal wastewater treatment plants is contained in waste amalgam from dental offices; about 30% from mercury equipment breakage and laboratory chemicals from hospitals, schools, and certain industries; and 20% from residential or unknown sources. While every community is somewhat different, this Guidance Manual focuses on mercury reduction by medical facilities, dental offices, schools, and some industries because of their historical or continuing use of mercury-containing products that impact wastewater. Facilities in these sectors need to participate in a Mercury Pollutant Minimization Program in order to minimize mercury discharges to their municipal wastewater treatment plant.

The table below identifies the mercury BMP Goal for each of these sectors as defined by the relevant trade association, standard treatment technology, or by common practice. In order to optimally help achieve the very low municipal water-quality-based limit of 1.3 ng/l, these BMPs call for mercury reduction by either minimizing the use of mercury products or by maximizing the capture of waste mercury products, or both, at least to the extent practicable. Similarly, the BMP Goal Implementation Date is a reasonable time frame for BMP implementation given the status of current mercury reduction practices and the need to minimize mercury discharges to sanitary sewers as soon as possible. Many Wisconsin facilities in these sectors have already implemented mercury BMPs, in part because mercury BMPs have been actively promoted by their trade associations or because the mercury BMPs are already common practice.

Table 4. Municipal Plant Users that Discharge Mercury

SECTOR	BMP GOAL	DEFINED BY
Hospitals/Clinics	Mercury-free	American Hospital Association and the U.S. EPA “Making Medicine Mercury Free” award criteria.
Dental Offices (With amalgam)	Maximize capture/recycle of wastewater mercury	American Dental Association, PLUS install and maintain an amalgam separator meeting the ISO 11143 standard (95% + amalgam removal from wastewater).
Schools/Colleges	Mercury-free	Wisconsin Department of Natural Resources and Wisconsin Department of Public Instruction “Green and Healthy Schools” mercury program.
General Industries	Bulk raw materials with low mercury content	Common practice for industries using large quantities of feedstock chemicals that can be contaminated with mercury when the chemicals are produced.
<u>BMP Goal Implementation Date:</u> As soon as practicable, but within two years following submittal of the Mercury PMP Plan.		

4. Other Community Sectors that Use Mercury Products.

The regulatory basis for this Guidance Manual is to attain municipal wastewater treatment plant compliance with Wisconsin water-quality-based effluent limits for mercury. However, a co-benefit of the Mercury PMP is the reduction of mercury releases to the air and solid waste environments from broken or discarded mercury products, even when the Mercury PMP has a wastewater focus. The experience from community mercury reduction pilot programs in Wisconsin is that municipal work with the general public on mercury thermometer recycling, HVAC contractors on mercury thermostat recycling, scrap yards on mercury auto switch recycling, and all sectors on fluorescent bulb recycling commonly occurred in parallel with mercury educational outreach to the medical, dental, school, and industrial sectors noted above.

Mercury reduction by the Other Community Sectors below is optional as part of a Mercury PMP but will be credited to the Mercury PMP if implemented, as allowed by NR 106.145(7)(f)4., Wis. Adm. Code.

Table 5. Other Community Sectors that Use Mercury Products

SECTOR	BMP GOAL
General Public	Reduce use of mercury products, increase recycling
HVAC contractors	Recycle mercury thermostats
Auto scrap yards	Recycle hood/trunk mercury switches
Fluorescent Bulbs	Use and recycle fluorescent bulbs
<u>BMP Goal Implementation Date:</u> No implementation deadline; credit Mercury PMP after accomplishment	

Steps for Implementing a Mercury Pollutant Minimization Program

The recommended steps for implementing a municipal Mercury PMP follow the “Plan,” “Do,” “Check,” “Act” sequence of activities familiar to Environmental Management Systems. These activities are applied to the goal of reducing mercury discharges to a municipal wastewater treatment plant:

“Plan” mercury educational outreach or regulatory activities to reduce mercury discharges by users of the sanitary sewer system;

“Do” educational outreach or regulatory activities to promote mercury BMP implementation by treatment plant users;

“Check” the progress of mercury BMP implementation and the trends in mercury discharge by the municipal wastewater treatment plant;

“Act” on your findings of mercury BMP implementation and treatment plant mercury trends by revising your planned mercury reduction activities for the next year.

Start by reading this Guidance Manual. It includes background information, instructions, forms, a mock plan, and a mock annual report that will help you submit a Mercury PMP Plan and subsequent Mercury PMP Annual Reports to the Department of Natural Resources as required by your WPDES wastewater permit.

Also read those sections of your Sewer Use Ordinance that discuss control of wastewater discharges into your treatment plant. If your plant has a federally and state approved Pretreatment Program under NR 211 Wis. Adm. Code, your ordinance will have a “local limit” for mercury and established procedures for regulating users of your sanitary sewer system. If your plant does not have a formal Pretreatment Program, your ordinance may contain a mercury discharge limit but will contain general language on controlling the discharge of pollutants to your system in instances where your plant is not meeting an effluent discharge standard, in this case, for mercury.

Wisconsin’s Pilot Community Mercury Reduction Program

Between 1997 and 2003 the Wisconsin Department of Natural Resources partnered with twenty Wisconsin communities to pilot Municipal Mercury Pollutant Minimization Programs. These programs successfully collected and recycled over 13,000 pounds of mercury. Further, most mercury-containing products were replaced with non-mercury alternative products so that the reduction was permanent.

Step 1. Prepare Your Mercury PMP Plan

(Start six months before the Plan due date)

Identify and list specific medical, dental, school, and industrial facilities that will need to implement, or report to you that they have already implemented, mercury reduction practices to limit their discharge of mercury to your sanitary sewer system.

Identify your staff and other partners who will implement your Mercury PMP. If yours is a large community, consider establishing a Mercury Team. The most important partners are representatives from the Sectors identified in Table 4, and educational outreach specialists from your department, community, or from the University of Wisconsin Extension.

Review the mercury outreach that you have already conducted with your medical, dental, school, and industrial facilities. Plan for the additional outreach activities that you will conduct over the next year, including timelines, to encourage and assess implementation of mercury Best Management Practices by your treatment plant users. The mailings, workshops, onsite visits, or other activities that you use will depend on the size of your community. See Appendix A for outreach examples that have been used successfully in Wisconsin.

Use the above information and the instructions in Chapter Three of this Guidance Manual to complete the Mercury PMP Plan forms that follow the instructions. Look at the mock PMP Plans in the appendices of this manual. ***The completed forms are your Mercury PMP Plan to be submitted to the Wisconsin Department of Natural Resources.***

Step 2. Implement Your Mercury PMP Plan

(In the first year following Plan submittal to WDNR)

Conduct mercury reduction educational outreach to the medical, dental, school, and industrial facilities identified in your Mercury PMP Plan. Ask these facilities to report the status of their mercury BMP implementation, or demonstrate with analytical means that they are not discharging mercury to the municipal sewerage system. Forms 4B, 5B, 6B, and 7B in Chapter Three contain the specific sector mercury BMPs for reporting by these facilities.

Conduct mercury reduction outreach to the general public, HVAC contractors, auto scrap yards and fluorescent bulb users at your option.

Step 3. Evaluate Your Mercury PMP Progress

(Before the end of the first year following Plan submittal to WDNR)

Compile and measure medical, dental, school, and industry progress towards implementation of mercury Best Management Practices using the facility checklists suggested in Chapter Three. Also compile municipal treatment plant influent, effluent, and biosolids mercury data.

The Community Mercury Score (Form 10 in Chapter Three) is a way to measure the progress of the municipal Mercury PMP. While only a guide, this Form was designed so municipalities can

score up to 100 points after three years of a well-implemented program and should be an aid to both the municipality and the Department of Natural Resources in measuring program progress.

If the Community Mercury Score is high, most or all of the significant mercury wastewater sources in your community will have implemented mercury Best Management Practices. It may take some time beyond even three years for mercury levels in the municipal treatment plant effluent to stabilize at or below 1.3 ng/l. Once the treatment plant effluent achieves 1.3 ng/l the municipality should implement enough oversight of their medical, dental, school, and industrial community to maintain that effluent quality.

If the Community Mercury Score is low, it means that too few of the medical facilities, dental offices, schools, and industrial sources have implemented Mercury Best Management Practices, or have otherwise not demonstrated compliance with the ordinance limit for mercury. It will be necessary for the municipality in the subsequent year to accelerate educational outreach activities or to issue user discharge permits, require wastewater sampling, conduct inspections, and implement sewer use ordinance enforcement procedures to support user attainment of mercury BMPs.

Mercury PMP Measurement

The adequacy of a Mercury Pollutant Minimization Program can only be evaluated by measuring both municipal implementation of mercury outreach and regulatory activities, and user implementation of mercury Best Management Practices. These measures are particularly necessary when the mercury discharge from the municipal plant does not meet 1.3 ng/l and the source of the mercury is the users of the sanitary sewer system. The forms recommended in Chapter Three capture municipal and user mercury program performance in a concise format that satisfies reporting obligations of both NR 106.145 and NR 211 Wis. Adm. Code.

Step 4. Prepare Your Mercury PMP Annual Report

(Start one month before the Annual Report due date)

Plan for additional educational outreach activities, or formal regulatory activities, to achieve user mercury BMP implementation not already reported if treatment plant effluent continues to exceed 1.3 ng/l. These activities will be implemented in the second year of your Mercury PMP.

Use the instructions in Chapter Three of this Guidance Manual to complete the Mercury PMP Annual Report forms that follow the instructions. Look at the mock PMP Annual Reports in the Appendices. These forms effectively amend your original Mercury PMP Plan with activities to be implemented in the next year. ***The completed forms are your Mercury PMP Annual Report to be submitted to the Wisconsin Department of Natural Resources.***

Step 5. Continue to Implement Your Mercury PMP Plan
(In the second and subsequent years of program implementation)

Repeat Steps 2, 3, and 4 above according to the activities included in your previous year's Mercury PMP Annual Report.

Municipal Collaboration on Mercury PMPs

As encouraged by NR 106.145(7)(h) Wis. Adm. Code, several municipalities may collaboratively plan and implement their Mercury PMPs in order to more efficiently conduct educational outreach and mercury product recycling. This will be particularly useful in a regional or watershed approach to mercury reduction. Each of their Mercury PMP Plans and Mercury PMP Annual Reports would include descriptions of simultaneous municipal activities. But each municipality would report only the mercury BMP implementation status of individual medical, dental, school, and industrial facilities discharging to their particular wastewater treatment plant. See Chapter Three for more information.

Note on Collection System Mercury Monitoring. The focus of the Mercury PMP Plan recommended in this Guidance Manual is on reducing mercury discharges from community sectors known to use mercury-containing products that impact wastewaters. If treatment plant effluent continues to exceed 1.3 ng/l even with consistent mercury BMP implementation by medical, dental, school, and industrial facilities, it will necessary for the municipality to conduct a collection system monitoring program for mercury to determine whether there are other significant upstream mercury sources. Some municipalities may elect to do this collection system monitoring program at the same time as their mercury source reduction program and nothing in this Guidance Manual is intended to discourage the municipality from doing so. However the intention of this Manual is to focus limited municipal resources on known mercury reduction opportunities first, with the estimation that treatment plant effluent of 1.3 ng/l will not be achieved without reduction by known mercury sources and may be achieved with reduction by only those sources. If a municipality has conducted a collection system mercury monitoring program they should submit their findings as a supplement to their Mercury PMP Plan or Mercury PMP Annual Report. We have not included a separate reporting form in this Guidance Manual for a Collection System Mercury Monitoring Program.

Mercury Best Management Practices (Mercury BMPs) as a Mercury Control Mechanism

Mercury Best Management Practices and Numerical Mercury Discharge Limits in Municipal Sewer Use Ordinances

All Wisconsin municipalities with treatment plant design flows greater than 5 million gallons per day (MGD) have numerical limits on user mercury discharges in their sewer use ordinances. These limits were developed through their formal Pretreatment Programs to prevent the pass through of mercury to Wisconsin surface waters and to protect plant biosolids quality. Municipalities with design flows between 1 and 5 MGD, who are also subject to Mercury PMP

requirements, generally do not have such numerical limits for mercury in their sewer use ordinances, with some exceptions.

For municipalities with numerical mercury ordinance limits, this Guidance Manual recommends that user facilities implementing mercury BMPs be deemed compliant with the numerical limit for mercury without the necessity of wastewater sampling and analysis. These users will have already implemented the best mercury management practices for their type of facility or business. Users of the sanitary sewer system should be capable of achieving compliance with numerical ordinance limits for mercury if they faithfully implement mercury BMPs. Oppositely, facilities not implementing mercury BMPs would need to demonstrate compliance with the numerical ordinance limit by analytical means.

Municipalities with numerical mercury limits should review their sewer use ordinance to determine whether they need to modify its language to expressly allow using mercury BMPs as a demonstration of compliance with the numerical limits, but such an ordinance modification is not routinely expected by this Guidance Manual as a matter of municipal wastewater sampling discretion. But if the municipality wishes to use mercury BMPs as a replacement or substitute for numerical mercury limits, rather than as a demonstration of compliance with those limits, then the sewer use ordinance would likely need to be modified to make clear that replacement.

Similarly, this Guidance Manual does not routinely require at the time of Mercury PMP Plan submittal that the municipality re-evaluate the adequacy of their existing numerical mercury ordinance limit. The adequacy of the limit to control user mercury discharges and prevent pass through was factored into the development of the existing limit. However, municipalities may elect to review their numerical mercury ordinance limit, or may be asked by the Department or USEPA to do so, as part of their periodic Pretreatment Program updating procedures that look at all metals discharge local limits. It would be appropriate to re-evaluate the adequacy of the existing numerical mercury ordinance limit after the municipality has achieved influent mercury reductions from known mercury sources through user BMP implementation of the municipal Mercury PMP program.

For those municipalities without numerical mercury ordinance limits, this Guidance Manual does not routinely require the adoption of a specific limit for mercury discharges to the sanitary sewer system. The ordinances for these mid-sized communities do contain general language that prohibits discharges to their systems that contribute to treatment plant exceedances of effluent limits, in this case for mercury. This Guidance Manual recommends that these municipalities obtain user implementation of mercury BMPs by relying on the existing pass through prohibitions of their ordinances. If users do not do so, the municipality may need to develop and enforce numerical mercury discharge limits or narrative mercury BMP requirements in their sewer use ordinance via NR 211.10(3) Wis. Adm. Code.

If a large municipal treatment plant intends to modify their sewer use ordinance to explicitly incorporate mercury Best Management Practices, or if a mid-sized community intends to modify their sewer use ordinance to adopt a numerical or narrative local limit for mercury, they should include a schedule for doing so in their Mercury PMP Plan or subsequent Mercury PMP Annual Report.

Mercury Best Management Practices and Traditional Wastewater Regulatory Procedures

1. User Discharge Permits. Few, if any, Wisconsin municipalities have issued discharge permits to sewerage system users in the Wastewater Sectors identified in this manual. This Guidance Manual DOES NOT recommend the issuance of discharge permits to facilities confirming their implementation of mercury BMPs, except (a) where the sewer use ordinance clearly requires the issuance of a permit to all classes of regulated facilities, or (b) where the issuance of a permit is necessary to recover municipal costs of the Mercury PMP. In either case a general discharge permit may be satisfactory. User facilities not confirming implementation of mercury BMPs may need to be issued discharge permits if necessary to support enforcement of the ordinance limit for mercury or the general prohibition on discharging pollutants to publicly owned treatment works that contribute to the municipal treatment plant not meeting final effluent limits.

2. User Inspections. This Guidance Manual DOES ask for inspections of facilities implementing mercury BMPs with a frequency that is (a) infrequent for facilities whose BMPs call for the virtual elimination of mercury products, and (b) annually for facilities whose BMPs call for continuing management of mercury wastes. For the latter, the inspection would review mercury waste management practices, maintenance of wastewater treatment equipment, and office recycling records. For large municipalities an annual program of partial user inspections and partial user self-certification of BMPs may be appropriate. In general the intensity of inspection oversight by the municipality should depend on how close the municipal treatment plant is to meeting 1.3ng/l for mercury in their effluent. Not meeting, or barely meeting, 1.3ng/l would imply a greater inspection frequency; comfortably meeting 1.3 ng/l a lesser frequency. A proposed inspection program should accompany the Mercury PMP Plan and can be included on the Chapter Three forms.

3. User Wastewater Sampling and Analysis. Sampling and analysis for low level mercury discharges by individual facilities can be difficult and expensive. This Guidance Manual DOES NOT recommend wastewater sampling and analysis at facilities confirming their implementation of mercury BMPs, except when inspections or other information suggests that mercury BMPs are not in fact being implemented. However, nothing in this Guidance Manual is intended to prevent the municipality from also determining compliance with numerical ordinance mercury limits by analytical means if they elect to do so. User facilities not confirming implementation of mercury BMPs should be asked to demonstrate compliance with the numerical ordinance limit for mercury by analytical means, including a program of self-monitoring by the user and compliance monitoring by the municipality.

4. Enforcement Procedures. This Guidance Manual DOES recommend that facilities satisfactorily implementing mercury BMPs be treated as compliant with the municipal sewer use ordinance. Facilities not confirming implementation of mercury BMPs should be determined to be compliant or noncompliant with a sewer use ordinance numerical mercury limit by analytical means, or with an ordinance narrative BMP requirement by inspection. Noncompliant facilities are subject to municipal ordinance enforcement procedures and remedies, including any

appropriate compliance schedules and monetary penalties. Compliance schedules should seek the earliest possible implementation of mercury BMPs. Monetary penalties should seek, at a minimum, cost recovery for municipal monitoring and enforcement and any savings from the delay of user BMP implementation.

**Mercury Best Management Practices
and Consistency With U.S. EPA Mercury PMP Guidance**

This Wisconsin Guidance Manual is believed to be consistent with the “Mercury Pollutant Minimization Program Guidance” issued by the U.S. Environmental Protection Agency – V in November 2004 and posted on the U.S.EPA website at:

<http://www.epa.gov/region5/water/npdestek/npdprta.htm>.

A copy of the EPA Guidance is included in Appendix B. The use of Best Management Practices as the mercury control mechanism for dischargers to sanitary sewer systems is discussed in Section 6 of U.S. EPA’s Guidance.

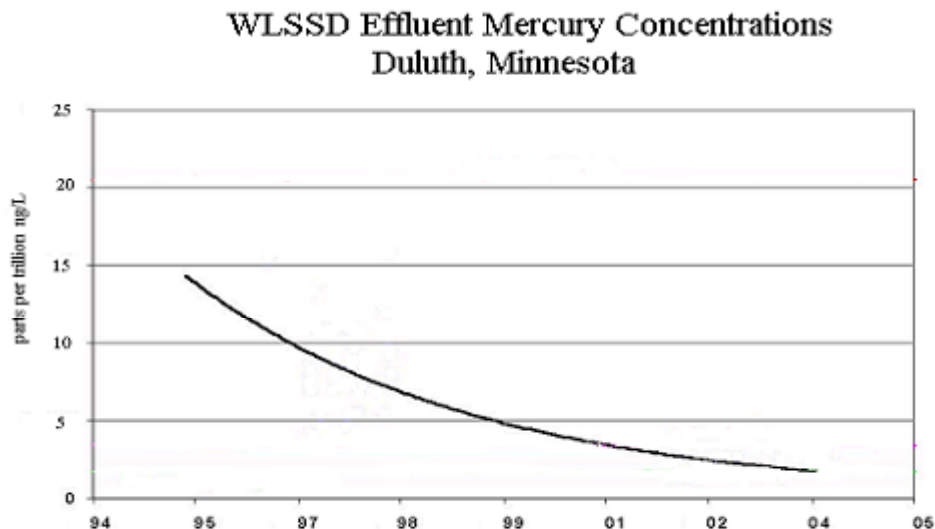


Figure 8. WLSSD effluent mercury concentrations through ten years of community mercury reduction

Chapter Three: Forms and Checklists

The following forms provide a structured format for a municipality to compile and report information on their Mercury Pollutant Minimization Program (Mercury PMP). As required by NR 106.145(7), Wis. Adm. Code, this information includes: mercury source identification, educational outreach activities, program effectiveness evaluation, and proposed program revisions. An initial Mercury PMP Plan and subsequent Mercury PMP Annual Reports can be prepared using the forms as scheduled in Table 6. Instructions for completing the forms are provided below. To assist in their preparation, a mock Plan and mock Annual Report for a small city (Smalltown WI) and a large city (Metrocity WI) are included in Appendices C through F at the end of this Guidance Manual.

Among the forms is a set of one-page checklists that can be completed by individual users of the sanitary sewer system: one for medical facilities, one for dental offices, one for schools, and one for industry. These forms list sector-specific mercury Best Management Practices (BMPs), or space for reporting wastewater mercury data if preferred. These forms will confirm to the municipality that mercury releases are being controlled or eliminated, and therefore that additional regulation of that user's wastewater discharge is unnecessary. A summary of user BMP implementation is submitted to the Wisconsin Department of Natural Resources as a Mercury PMP Annual Report effectiveness measure, but the municipality retains the individual user checklist forms. These user reports can be requested under the authority of the municipality's sewer use ordinance, as necessary.

The intention of all these forms is to streamline the reporting of community mercury reduction into a standard format that will provide useful information to the Department of Natural Resources, to the municipality, and to users of the sanitary sewer system. All of the following Mercury PMP submittals and evaluations are aided by the use of these forms:

- Preparation and review of the Mercury PMP Plan;
- Preparation and review of Mercury PMP Annual Reports;
- Measurement of individual user facility mercury reduction progress;
- Measurement of community mercury reduction progress; and,
- Mercury program consistency around Wisconsin.

However, these forms are guidance. If a municipality or municipal treatment plant user has equivalent information in a different clear and organized format, that alternative reporting format can be submitted. The Department of Natural Resources also recognizes that each municipality's mercury reduction program will be somewhat different, in particular because of differences in municipal population and treatment plant user complexity. It is always possible to discuss an alternative Mercury PMP Plan with the Department of Natural Resources prior to submission of the Plan. But the Plan must ensure measurable treatment plant progress towards meeting the mercury effluent goal of 1.3 ng/l in the shortest reasonable timeframe.

Table 6. Summary of Forms needed for Plan vs. Annual Report

Mercury Pollutant Minimization Program Forms	Initial Plan	Annual Report
Form 1: Mercury PMP Report Cover Sheet	X	X
Form 2: Mercury PMP Summary Of Resources	X	X
Form 3: Mercury PMP Summary Of Treatment Plant Analytical Mercury Data	X	X
Form 4A: Medical Facility Inventory	X	X
Form 4B: Medical Facility Mercury Checklist		
Form 4C: Medical Facility Compliance And Outreach Summary	X	X
Form 5A: Dental Facility Inventory	X	X
Form 5B: Dental Facility Mercury Checklist		
Form 5C: Dental Facility Compliance And Outreach Summary	X	X
Form 6A: School And Educational Facility Inventory	X	X
Form 6B: School Mercury Checklist		
Form 6C: School And Educational Facility Compliance And Outreach Summary	X	X
Form 7A: Industry Inventory	X	X
Form 7B: Industry Mercury Checklist		
Form 7C: Industry Compliance And Outreach Summary	X	X
Form 8A: General Public Mercury Checklist And Outreach Summary		X
Form 8B: HVAC (Thermostat) Mercury Checklist And Outreach Summary		X
Form 8C: Auto Switch Mercury Checklist And Outreach Summary		X
Form 8D: Fluorescent Bulb Mercury Checklist And Outreach Summary		X
Form 9A: Historical Mercury PMP Score	X	X
Form 9B: Extra-Jurisdictional Mercury PMP Score	X	X
Form 10: Community Mercury PMP Score		X

Directions for Completing Forms

Form 1. Mercury PMP Report Cover Sheet

Form 1 provides basic municipal treatment plant identifying information. If this is the first time you are submitting these forms, check “Initial Plan.” In subsequent years check “Annual Report” and also supply the date you submitted your original Initial Plan.

For the initial Mercury PMP Plan leave the “Mercury Effluent Limit (ng/l)” entry blank, as the limit will be determined by the Department of Natural Resources from the mercury data included in the Initial Plan. This form also identifies the person to contact regarding information contained in this report. When a report is submitted, an authorized official of the municipality must sign this form.

Form 2. Mercury PMP Summary of Resources

Form 2 provides an estimate of personnel time and costs associated with implementation of the Mercury Pollutant Minimization Program. For the Initial Plan list time and costs that went into preparation of the Mercury PMP Plan; for subsequent Annual Reports list time and costs incurred in the past year. In both reports you can describe changes in program resources that you anticipate in the coming year, but do not include future time or costs in the current Annual Report; they will be included in next year’s Annual Report.

In both reports you can also describe other departments, agencies, organizations, or municipalities with whom you collaborated on your Mercury PMP Plan development or subsequent Plan implementation.

NR106.145(7)(c)3. requires “a program for collecting mercury from the permittee’s sewer system users” either by the municipal permittee or by others. List the mercury recycling options that are available in your community.

Form 3. Mercury PMP Summary of Treatment Plant Analytical Mercury Data

Form 3 is a summary of the municipal treatment plant’s influent, effluent, and biosolids mercury data. For the initial Mercury PMP Plan include all mercury data from the date the municipality initiated low-level mercury sampling and analysis, even if there are more than twelve months of data. All of the low-level effluent data will be used by the Department of Natural Resources to determine the need for, and to calculate, the alternative mercury effluent limit (AMEL) for the treatment plant. For the Mercury PMP Annual Report include the twelve months of data from the preceding year. Influent and effluent data should be reported in ng/l; biosolids data should be reported in mg/kg.

We encourage you to compare the most recent year’s mercury data with the influent, effluent, and biosolids averages from preceding years in order to determine mercury trends. At the bottom of the form please report the numerical or narrative mercury limit in your sewer use ordinance that applies to users of the sanitary sewer system, if you have such a limit.

Forms 4 – 7. Wastewater Sectors: Medical, Dental, Schools, and Industry

Each of these four sectors has three forms: A, B, and C that are important to reporting and evaluating community mercury reduction progress that will impact wastewaters. The A and C Forms are needed to complete the Mercury PMP Plan and all three A, B, and C Forms are needed to complete the Mercury PMP Annual Report, as described below.

Forms 4A, 5A, 6A, and 7A (the A Forms). Sector Inventory Forms

The A Forms are a list of all individual facilities in each wastewater sector that may be a potential source of mercury to the municipal treatment plant. An inventory for each sector needs to be included in the initial Mercury PMP Plan, and a complete and updated inventory for each sector included with each Mercury PMP Annual Report. A “facility” is one entity in a sector, e.g., a hospital is a facility in the medical sector. For very large municipalities it may be necessary to attach additional sheets if the requested information will not fit on one form. Include only facilities that are tributary to the treatment plant for which the PMP Plan and PMP Annual Report are being prepared.

Medical facilities include all hospitals, clinics, and veterinary facilities **that have laboratories**, (including laboratories contracted or managed independently of the medical facility).

Dental facilities include all dental offices **that install or remove amalgam fillings**.

School facilities include all public and private schools **with science laboratories**, including middle schools, high schools, technical schools, colleges and universities but not elementary schools.

Industrial facilities include all industrial plants **with the potential for mercury in their wastewater**.

Notice that we have restricted the listing of facilities in each sector to those most likely to discharge mercury to the sanitary sewer system. **Industrial facilities** may also be restricted to plants which meet any one of these three criteria: (a) the municipality or industry has plant mercury effluent data and the data occasionally or regularly exceeds the sewer use ordinance numerical limit for mercury, (b) the plant discharges more than 25,000 gallons per day or more than 5% of the municipal treatment plant flow **and** the plant uses large quantities of feedstock chemicals in their manufacturing process, or (c) the municipal wastewater treatment plant itself. Industrial wastewaters may be either piped or hauled to the municipal treatment plant. It is anticipated that few industrial facilities will need to be included in the Mercury PMP inventory.

Forms 4B, 5B, 6B, and 7B (the B Forms). Facility Mercury BMP Checklists

In the first year following submission of the initial Mercury PMP Plan, mail or deliver the appropriate Facility Mercury Checklist (B Form) to each facility identified on the sector inventory A Form. The B Form should be accompanied by a cover letter stating what they are for and why it is important for each facility to complete the best management practices checklist and return it to the municipality in a timely manner. If some facilities do not return the forms, follow-up letters or site visits should be implemented in order to determine that facility’s current

mercury management practices. Alternatively, a few facilities may elect to demonstrate that they are not discharging mercury by wastewater sampling and analysis. Most facilities are expected to complete the Best Management Practices and not perform effluent analysis.

A summary of the checklist responses, but not the B Forms themselves, will be included on the Compliance and Outreach Summary (C Form) as part of each year's Mercury PMP Annual Report. The completed and signed B Forms should be retained by the municipality at least until the municipal treatment plant achieves and maintains final effluent mercury at or below 1.3 ng/l.

Forms 4C, 5C, 6C, and 7C (the C Forms). Sector Compliance and Outreach Summary Forms

Only the "Outreach Accomplished" and "Outreach Planned" sections of the C Forms are submitted with the initial Mercury PMP Plan. The "Outreach Accomplished," "Outreach Planned," and the three Compliance Columns of the C Forms are submitted with the Mercury PMP Annual Report. A separate C Form is needed for each wastewater sector, paired with the separate inventory A Form for each sector. As with the A Forms, more than one sheet of the C Forms may be necessary to list all individual facilities in a wastewater sector that are tributary to a large municipality.

Outreach Summary. There are two kinds of mercury reduction outreach summarized on the C Forms: general outreach on the top of each form (general mailings, multiple-facility workshops, etc.) and individual facility outreach in the middle of each form (name of facility, individual facility site visits, mercury best management practices inspections, wastewater outfall sampling, etc.).

In the initial Mercury PMP Plan list the date and type of historical "Outreach Accomplished," and next year's "Outreach Planned," for each wastewater sector. Use the general and individual facility parts of the C Form as appropriate. The list of individual facilities on the C Form for a wastewater sector should match the inventory list of individual facilities on the A Form for that same sector. Use the C Forms in the same manner for the Mercury PMP Annual Report with "Outreach Accomplished" including just activities performed during the past year and "Outreach Planned" in the coming year. Remember that you should list outreach accomplished or planned at the listed facilities whether performed by you or by some other partner with whom you have collaborated.

Early in the Mercury PMP Program, much of the mercury educational outreach may be general and aimed at whole wastewater sectors. Over time, individual facility outreach should more closely target facilities that have not yet reported implementation of mercury best management practices (BMPs). However, as noted under **User Inspections in Chapter Two** of this Guidance Manual, there does need to be at least some level of confirmation oversight by the municipality even at facilities reporting BMP implementation. General mercury educational outreach, BMP non-implementing outreach, and BMP continuing oversight should all be planned and reported on the C Forms.

Compliance Summary. As part of your Outreach Summary above, you will have already listed each facility from the wastewater sector inventory Form A in the middle left column of the C

Form. In your Mercury PMP Annual Report (these columns are left blank in the Mercury PMP Plan) use the information from the individual returned B Forms to complete the three compliance columns in the middle of the C Form. Indicate with a simple check whether a facility:

- First column - has implemented **all** wastewater best management practices; or
 - Second column - has reported a schedule to implement **all** wastewater best management practices (or has implemented some practices and scheduled all the other practices); or
 - Third column - has submitted wastewater data demonstrating compliance with the sewer use ordinance discharge limit for mercury.
- Check only one box per facility. In reviewing the B Forms note that the “wastewater” best management practices on the B Forms are only those practices that are not starred or are not listed as optional. Some discretion may be necessary in interpreting whether a particular user facility has implemented all the mercury reduction practices that could impact their wastewater discharges.
- Facilities that have not returned a B Form, or equivalent mercury management practices information, should have **no** column checked.
 - Facilities with **any** wastewater mercury management practices that are neither accomplished nor scheduled, and have no compliance data, should have **no** column checked.
 - Facilities with schedules for **any** wastewater mercury management practices that extend beyond two years from the date of municipal Mercury PMP Plan submittal, and have no compliance data, should have **no** column checked.

Those facilities not reporting implementation of all wastewater mercury best management practices, nor with mercury compliance data, should receive mercury reduction outreach in the coming year. The type of outreach should be scheduled in the middle right column of the C Form. It will be necessary to update these facilities’ individual B Forms, and consequently their compliance entry on the C Form with the next Mercury PMP Annual Report.

At the bottom of each wastewater sector C Form add up the number of facilities with checks in each compliance column and calculate the percent checks using the number of facilities inventoried in that sector (the A Form) as the base denominator. Add the three column percents and enter the total on the C Form bottom line and on the appropriate line of Form 10 Community Mercury PMP Score. The total percent will be a number between 0 and 100 depending on what fraction of facilities in this sector have implemented mercury best management practices, or are scheduled to implement those practices within a reasonable time period. This is your mercury reduction performance measure for that particular sector of your community.

Forms 8A – 8D. Other Community Sectors: General Public, HVAC, Auto Switch, and Fluorescent Bulbs

Each of these four sectors has one form: 8A, 8B, 8C, and 8D. These forms do **not** need to be submitted with the initial Mercury PMP Plan but they **may** be submitted with a Mercury PMP Annual Report.

Municipalities are not required to target these sectors with mercury reduction activities because spilled or broken mercury products in these sectors generally do not directly impact mercury discharges to the wastewater treatment plant. However, our experience from the pilot community mercury reduction work in Wisconsin is that mercury reduction outreach to these secondary sectors may commonly occur along with outreach to the wastewater Medical, Dental, School, and Industry sectors. If a municipality conducts mercury reduction activities with these sectors, the Department of Natural Resources will give some additional credit to the Mercury PMP program. Again, these activities within the reporting municipality may be performed by the municipality itself or by some other partner with whom the municipality has collaborated.

Each of the 8A-8D Forms should be completed with work accomplished in the last twelve months (since the preceding year's Mercury PMP Annual Report), as described below.

Form 8A. General Public Mercury Checklist and Outreach Summary

In the first table, first column, list specific mercury-containing household products such as thermometers and thermostats. In the second column list any ordinances that have resulted in the discontinued sale or ban of that product. In the last column, indicate the number, weight, or volume of household products that have been recycled as a result of municipal mercury outreach activities over the last 12 months, if known. Do not include fluorescent bulbs on this form – Form 8D is specifically devoted to fluorescent bulb outreach and recycling.

The second table lists possible mercury-related outreach activities targeted to the general public. Indicate the date in the past year that a certain outreach activity took place by entering it in the appropriate column. If a particular outreach activity is not listed, enter it into the “Other” column and briefly describe the activity. The General Public sector evaluation is at the bottom of the form; the number of outreach events relative to the municipality's size determines the score. Count the number of distinct outreach events listed in the second table and multiply that number by the municipality's “facility factor.” The facility factor is determined by the wastewater treatment plant's average daily flow, in millions of gallons per day (MGD). A key is included in the right-hand box at the bottom of the form. Enter the product of these two numbers in the indicated space. This is reported on Form 10 in the score area for this General Public Mercury PMP Score (do not enter a number larger than 100).

Form 8B. HVAC (Thermostat) Mercury Checklist and Outreach Summary

In the first table, list the Heating, Ventilation, and Air Conditioning (HVAC) wholesalers/contractors and retail stores that collect and recycle mercury thermostats. This list should only include HVAC wholesalers and contractors, not general construction contractors within the service area. Below the first table, provide the number of HVAC wholesalers/contractors in the service area as a whole (do not include retail stores), including

those that do not collect and recycle mercury thermostats. This number will be used to determine the HVAC Mercury PMP score.

The second table lists possible mercury-related outreach activities aimed at the HVAC industry. List the date in the past year that a certain outreach activity took place in the appropriate column. If a particular outreach activity is not listed, enter it in the “Other” column and describe the activity. The HVAC industry sector evaluation is at the bottom of the form. Divide the number of HVAC wholesalers/contractors (not retail stores) listed in the first table by the number you entered below the first table and put it in the given space at the bottom of the form. This HVAC (Thermostat) Mercury PMP Score is reported in Form 10 in the score area for this sector.

Form 8C. Auto Switch Mercury Checklist and Outreach Summary

In the first table, list the auto scrap yards and dealerships that remove and recycle mercury hood and trunk switches. At the bottom of the table, list the total number of scrap yards and dealerships in the service area, even those that do not remove and recycle mercury switches. This number will be used to determine the auto mercury switch PMP score.

The second table lists possible mercury-related outreach activities targeted to auto scrap yards or dealerships. Enter the date in the past year that a certain outreach activity took place by listing it in the appropriate column. If a particular outreach activity is not listed, enter it into the “Other” column and describe the activity. The auto scrap yard/dealership sector evaluation is at the bottom of the form. Divide the number of scrap yards and dealerships that collect and recycle mercury switches by the number you entered below the first table and put it in the given space at the bottom of the form. This Auto Switch Mercury PMP Score is reported on Form 10 in the score area for the corresponding sector.

Form 8D. Fluorescent Bulb Mercury Checklist and Outreach Summary

In the first table, list participation by businesses in recycling their burned-out fluorescent bulbs, including both continuous and one-time “CleanSweep” events in the first column. In the second column, list participation by households.

The second table lists possible fluorescent bulb recycling outreach. Enter the date that an outreach activity took place in the past year by listing it in the appropriate column. If a particular outreach activity is not listed, enter it in the “Other” column and describe the activity. The fluorescent lamp sector evaluation is at the bottom of the form; the number of outreach events relative to the municipality’s size determines the score. Count the number of distinct outreach events listed in the second table and multiply that number by the municipality’s “facility factor.” Facility factor is determined by the wastewater treatment plant’s average daily flow, in millions of gallons per day (MGD). A key is included in the right-hand box at the bottom of the form. Enter the product of these two numbers in the indicated space. The Fluorescent Bulb Sector Score is reported on Form 10 in the score area for this sector (do not enter a number larger than 100).

Forms 9A - 9B. Optional Community Mercury Scores: Historical and Extrajurisdictional

Many municipalities have conducted, or continue to conduct, two kinds of mercury reduction work that will not be fully credited to their Mercury Pollutant Minimization Program by using the Wastewater Sector and Other Community Sector reporting forms described above:

- Historical mercury reduction work that preceded the development of their Mercury PMP Plan; and,
- Extra-jurisdictional mercury reduction work that occurred, or continues to occur, outside the boundary of their sewer service area.

These activities can be credited to the Mercury PMP by using Forms 9A and 9B as described below.

Form 9A. Historical Mercury PMP Score

Because this form only documents mercury reduction outreach and accomplishment conducted before the formal Mercury PMP Plan was submitted, it will not change from year to year. However, this form should be submitted with the Mercury PMP Plan as a record of the range of historical mercury reduction work in the community, and with each Mercury PMP Annual Report for credit to the Mercury PMP program. Of course if no mercury reduction work was implemented prior to Mercury PMP Plan submittal, this form should not be attached to either the Plan or the Annual Report.

The form is divided into outreach aimed at wastewater sectors, other community sectors, and at least one other mercury product: “dairy manometer” refers to farms that participated in a WDNR program to replace their milk house mercury manometer with a non-mercury vacuum gauge. For each historical outreach activity and sector accomplishment put a check in the corresponding box. To calculate the Historical Mercury Score, simply count the number of boxes checked and include the number on the bottom of Form 9A and on the appropriate line of Form 10.

Form 9B. Extra-jurisdictional Mercury PMP Score

This form documents a municipality’s mercury reduction outreach and accomplishment outside the municipal treatment plant service area. This work may be either historical or ongoing or both. This form should be submitted with the Mercury PMP Plan as a record of historical mercury reduction work outside the service area, and with each Mercury PMP Annual Report for ongoing credit to the Mercury PMP program. For the Mercury PMP Annual Report, include only activities and accomplishments that occurred in the last twelve months (since the preceding year’s Mercury PMP Annual Report). Of course if no extra-jurisdictional mercury reduction work has, or is, occurring this form should not be attached to either the Plan or Annual Report. Form 9B is completed with checks and tallied in the same manner as Form 9A above.

Notice that if two municipalities were collaborating on their mercury reduction programs they would both get credit for extra-jurisdictional work in the other community, as long as they actually did educational outreach within the other community’s treatment plant service area. If

only one of the municipalities did the outreach in both communities only that one municipality could claim the extra-jurisdictional credit. Again, the Department of Natural Resources encourages collaboration between municipalities on their mercury reduction programs.

Form 10. Community Mercury PMP Score

Form 10 is used as one measure of the progress of the municipal Mercury Pollutant Minimization Program. While only a guide, this Form was designed so municipalities should score 100+ points after three years of a well-implemented program. The scores from the Wastewater Sectors (Forms 4C, 5C, 6C and 7C), the Other Community Sectors (Forms 8A, 8B, 8C and 8D), and the Historical and Extra-jurisdictional Forms 9A and 9B are compiled on Form 10. On one sheet the municipality, the users of the municipal sanitary sewer system, and the Department of Natural Resources can view the performance of different areas of the Mercury PMP program.

Form 10 is not submitted with the Mercury PMP Plan because the mercury reduction activities necessary to complete these forms will not have been implemented at the time the Plan is submitted. Form 10 should be submitted with each Mercury PMP Annual Report as one program performance measure. Of course the Form 3 Summary of Treatment Plant Analytical Mercury Data is another program performance measure, with attainment of 1.3 ng/l in the treatment plant effluent as the most important measure of all.

Wastewater Sectors

Enter the Medical Sector score from Form 4C, the Dental Sector score from Form 5C, the School Sector score from Form 6C, and Industry Sector score from Form 7C. The “Weighting Factor” corresponds to the relative contribution of mercury influent to your municipal treatment plant that is attributable to each sector; the weighting factors must add to 1. Use the Weighting Factors shown in brackets () on Form 10 unless you know that a different percentage mercury is discharged to your plant from these sectors. To get the “Weighted Sector Score,” multiply the Sector Score by the Weighting Factor for that sector. Add the Weighted Sector Scores and enter the value (which will be between 0 and 100) in the “Total Wastewater Sectors Score” box.

Other Community Sectors

Although you are not required to enter a score for the Other Community Sectors, you can get credit for your mercury reduction work with these sectors by completing this section of Form 10. Enter the General Public score from Form 8A, the HVAC score from Form 8B, the Auto Switch score from Form 8C, and the Fluorescent Bulb score from Form 8D. The “Weighting Factor” for the Other Community Sectors reflects whether or not a State Pretreatment Program Control Authority wants to credit the municipality for mercury reduction work with the non-wastewater sectors. Wisconsin does want to give this credit, although the total score for the Other Community Sectors cannot be as high as for the Wastewater Sectors. Use the Weighting Factor shown on Form 10. To get the “Weighted Sector Score,” multiply the Sector Score by the Weighting Factor for that sector. Add the Weighted Sector Scores and enter the value (which will be between 0 and 40) in the “Total Optional Sectors Score” box.

Other Credits

These credits are also optional. Enter the Historical Score from Form 9A and the Extra-jurisdictional Score from Form 9B. The Weighting Factors and the method of calculating Weighted Scores are the same as for the Other Community Sectors above. Add the Weighted Scores and enter the value (which will be between 0 and 20) in the “Total Other PMP Credits Score” box.

Community Mercury PMP Score

Sum the Total Wastewater Sectors Score, the Total Other Community Sectors Score, and the Total Other PMP Credit Score to get the Community Mercury PMP Score. Notice that you can score 100 points if all of the individual facilities in your Medical, Dental, School, and Industry Wastewater Sectors have implemented their mercury Best Management Practices, even if no work was done with the Other Community Sectors or for Historical or Extra-jurisdictional Credit. Alternatively, you will not reach 100 points by only working with the Other Community Sectors or receiving credit for Historical or Extra-jurisdictional work. Facilities in the Wastewater Sectors release mercury to the sanitary sewer system and must implement mercury BMPs, or demonstrate by analytical means that they do not discharge mercury, if your municipality is to achieve a final effluent of 1.3 ng/l.

Forms are intentionally placed on individual pages with nothing on the back to facilitate photocopying for facilities that chose to do so.